4. ENVIRONMENTAL CONSEQUENCES

This section analyzes the potential impacts to human and environmental resources resulting from construction and demonstration of the proposed multi-pollutant control system and for four reasonably foreseeable scenarios of no action. Potentially affected physical, biological, social, and economic resources are included.

4.1 ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

4.1.1 Land Use and Aesthetics

4.1.1.1 Land Use

On the Greenidge Station site, the proposed project would require about 3 acres of land adjacent to the existing powerhouse for construction of new facilities (Section 2.1.6.1). This land currently is dedicated to industrial uses and is mostly paved. Because construction would displace an existing parking area, a nearby vacant land area of similar size would probably be developed for parking. The land that would be occupied by a new parking lot is cleared and is dedicated to industrial use, but has not previously been developed.

Disposal of fly ash generated by project operation would be in the nearby AES-owned, double-lined Lockwood Landfill, which is a state-permitted landfill on a site that is already dedicated to waste disposal.

The proposed project would not affect offsite land use because it would be confined to an existing industrial area within the Greenidge Station and Lockwood Landfill property. As with Greenidge Station, the proposed project would be consistent with existing land use plans and local zoning. The in-migration of workers that would result from project construction would not be large enough to increase the amount of offsite land required for residential purposes (Section 4.1.9.3).

4.1.1.2 Aesthetics

Greenidge Station is visible from the surrounding local area (Figure 2.1.3), including from nearby Seneca Lake. Because the proposed project's equipment would be installed adjacent to the west side of the existing powerhouse, portions of the equipment would be visible from the west, including along nearby State Highway 14. However, because of the similarity of the architecture and colors associated with the existing and new equipment, any visible portions would blend into the existing industrial structures. From other viewpoints, including Seneca Lake, the proposed equipment would likely be obscured by the taller, existing power plant structures. Existing vegetation would also contribute in some locations to the visual screening of the proposed equipment. In summary, because the visual landscape of the Greenidge Station property is already conspicuously marked with industrial structures (Section 3.1), the visual impacts of the facilities on the property after installation of the proposed project's equipment would be indistinguishable from the existing visual impacts.

With regard to Lockwood Landfill, the proposed project would not affect the visual appearance of the landfill.

4.1.2 Atmospheric Resources and Air Quality

This section evaluates potential impacts to atmospheric resources that may result from construction or operation of the proposed project. Section 4.1.2.1 discusses effects of construction, including fugitive dust associated with earthwork and excavation. Section 4.1.2.2 discusses operational effects, particularly with regard to changes from existing operations.

4.1.2.1 Construction

During construction of the integrated multi-pollutant control system, temporary and localized increases in atmospheric concentrations of NO_x, CO, SO_2, VOCs, and particulate matter would result from exhaust emissions of workers' vehicles, heavy construction vehicles, diesel generators, and other machinery and tools. Construction vehicles and machinery would be equipped with standard pollution-control devices to minimize emissions. These emissions would be very small compared to regulatory thresholds typically used to determine whether further air quality impact analysis is necessary [40 CFR Part 93.153(b)].

Fugitive dust would result from excavation and earthwork. The proposed project would use a total of about 3 acres of previously disturbed land, primarily for the new ESP or baghouse and surrounding access space. Limited site clearing and grading would be required because the land currently serves as a paved laydown area and contractor parking lot adjacent to the existing powerhouse for Units 3 and 4. A new paved parking lot would likely be built on vacant, cleared land near the powerhouse to compensate for the loss of the existing lot. The temporary impacts of fugitive dust on offsite ambient air concentrations of particulate matter less than 10 µm in aerodynamic diameter (PM-10) would be localized because of the small construction area, the limited amount of clearing and grading, and the relatively rapid settling of fugitive dust due to its relatively large size. Sprinkling of exposed soils with water would be conducted as necessary to minimize fugitive dust emissions.

4.1.2.2 Operation

Potential air quality impacts resulting from changes at Greenidge Station during demonstration of the proposed project would generally be beneficial because, with the exception of ammonia (NH_3), plantwide air emissions would decrease or continue at the same level (Section 2.1.7.1). SO_2 emissions would decrease from 19,450 tons per year currently to 6,683 tons per year. NO_x emissions would decrease from 3,190 tons per year currently to 2,030 tons per year. PM-10 and PM-2.5 emissions are assumed to continue at their existing level of 95 and 42 tons per year, respectively (Section 2.1.7.1). CO and volatile organic compound (VOC) emissions would also be expected to remain at their current level (i.e., 92 and 18 tons per year, respectively). Plantwide Hg emissions would decrease from about 36 lb per year currently to about 22 lb per year. NH_3 emissions would increase from near zero to about 280 lb per year. Plantwide HCl and HF emissions would decrease to about 147 and 19 tons per year, respectively, compared with current emissions of 409 and 50 tons per year, respectively. As discussed in Section 2.1.7.1, annual CO_2 emissions would probably not change substantially from the current level of 1,300,000 tons.

The existing 250-ft stack that serves Unit 3 and 227-ft stack that serves Unit 4 would continue to be used (the stack tops are at the same elevation, but the base elevation of the Unit 4 stack is 23 ft above the Unit 3 stack base elevation). While the Unit 3 stack parameters would not change and the Unit 4 stack height and flue diameter would remain the same during the demonstration, the Unit 4 exit temperature and exit velocity would decrease. The exit temperature would decrease from the current 235°F to 153°F, and the exit velocity would drop from the existing 46 miles per hour to 31 miles per hour. Consequently, the decreased exit temperature and exit velocity during the demonstration would decrease the plume rise from the Unit 4 stack, which could result in increased downwind ground-level concentrations of those air pollutants experiencing little or no decrease in stack emissions.

An analysis of the magnitude of the changes in ground-level pollutant concentrations resulting from changes in Unit 4 stack parameters was conducted using the EPA-approved SCREEN3 air dispersion model (EPA 1995). SCREEN3 was used because the nearest wind data required by more detailed models are recorded at Penn Yan, which is located about 7 miles to the west of Greenidge Station (Section 3.2.1), and because the SCREEN3 results are conservative (forming an upper bound) using a full range of potential meteorological conditions. Because the height of the Unit 4 stack is approximately 2.5 times the height of the adjacent powerhouse (i.e., Good Engineering Practice stack height), wake effects from building downwash were not considered. Because increased ground-level concentrations resulting from a lower plume height would be maximized in elevated terrain, locations representing the steepest rise in terrain within 4 miles of the power plant were selected for use in the model.

The results from the model were applied to particulate emissions from Unit 4, conservatively assuming that no reduction in emissions resulting from the proposed project would occur. Hourly emissions were calculated by adjusting the 2002 base year emissions (Table 2.1.1) by the 80% capacity factor (i.e., dividing by 0.8), a reasonable assumption given that Unit 4 is usually at peak capacity when it's operating. Conversion factors were used to adjust the maximum 1-hour concentrations predicted by SCREEN3 to 24-hour and annual averages (EPA 1992), as required for comparison with applicable particulate standards.

The maximum increases in PM-10 concentrations were predicted to be 2 $\mu g/m^3$ for a 24-hour averaging period and 0.4 $\mu g/m^3$ for an annual averaging period. The maximum increases in PM-2.5 concentrations were predicted to be 1 $\mu g/m^3$ for a 24-hour averaging period and 0.2 $\mu g/m^3$ for an annual averaging period. These increases were predicted to occur about 1.5 miles to the south of Greenidge Station in elevated terrain at an elevation about 50 ft above the stack top elevation. In actuality, the frequency of winds from the north (which would transport emissions to the south) is likely to be low, as indicated by the Penn Yan wind rose (Figure 3.2.1).

The maximum increases in predicted PM-10 and PM-2.5 ground-level concentrations resulting from the decrease in Unit 4 plume rise were compared with the applicable NAAQS (Table 4.1.1) and the PSD Class II increments (Table 4.1.2). These comparisons are not regulatory requirements but are used as metrics in this analysis to evaluate the potential significance of the increases. As indicated in Table 4.1.1, the sum

Table 4.1.1. Ambient air quality standards impact analysis for the proposed project

Pollutant	Averaging period	NAAQS[a] (μg/m^3)	Maximum modeled increase (μg/m^3)	Ambient background concentration [b] (μg/m^3)	Total impact [c] (μg/m^3)	Total impact as a percentage of NAAQS
PM-10 [d]	24-hour	150	2	42	44	29
	Annual	50	0.4	19	19.4	39
PM-2.5 [e]	24-hour	65	1	36	37	57
	Annual	15	0.2	11.8	12	80

[a] National Ambient Air Quality Standards (NAAQS). The NAAQS are established in accordance with the Clean Air Act to protect public health and welfare with an adequate margin of safety.
[b] At nearest monitoring station.
[c] The sum of the maximum modeled increase and the ambient background concentration.
[d] PM-10 = particulate matter less than 10 μm in aerodynamic diameter.
[e] PM-2.5 = particulate matter less than 2.5 μm in aerodynamic diameter.

Table 4.1.2. Prevention of Significant Deterioration (PSD) impact analysis for the proposed project

Pollutant	Averaging period	PSD Class II increment[a] (μg/m^3)	Maximum modeled increase (μg/m^3)	Percentage of PSD Class II increment
PM-10[b]	24-hour	30	2	7
	Annual	17	0.4	2

[a]PSD increments are standards established in accordance with the Clean Air Act provisions to limit the degradation of ambient air quality in areas in attainment of the National Ambient Air Quality Standards.
[b]PM-10 = particulate matter less than 10 μm in aerodynamic diameter.

of the maximum increase in modeled 24-hour PM-10 concentration (2 μg/m^3) added to the 24-hour background concentration of 42 μg/m^3 in 2003 at the nearest monitoring station in Niagara Falls (Section 3.2.2) yields a total of 44 μg/m^3, which is 29% of the corresponding NAAQS of 150 μg/m^3. The sum of the maximum increase in modeled annual PM-10 concentration (0.4 μg/m^3) added to the annual background concentration of 19 μg/m^3 at Niagara Falls yields a total of 19.4 μg/m^3, which is 39% of the corresponding NAAQS of 50 μg/m^3. Similarly for PM-2.5, the sum of the maximum increase in modeled 24-hour PM-2.5 concentration (1 μg/m^3) added to the 24-hour background concentration of 36 μg/m^3 in 2003 at the nearest monitoring station in Rochester (Section 3.2.2) yields a total of 37 μg/m^3, which is 57% of the corresponding NAAQS of 65 μg/m^3. Finally, the sum of the maximum increase in modeled annual PM-2.5 concentration (0.2 μg/m^3) added to the annual background concentration of 11.8 μg/m^3 at Rochester yields a total of 12 μg/m^3, which is 80% of the corresponding NAAQS of 15 μg/m^3. In each of the above cases, the background concentrations contribute much more to the respective totals than the maximum predicted increases associated with the proposed project. Because the nearest air monitoring stations are distant from Greenidge Station (Section 3.2.2) in locations likely to have higher ambient particulate concentrations, the above estimates are likely to form an upper bound of actual expected concentrations and percentages of the standards.

As an additional analysis, maximum increases in modeled concentrations were compared directly with the PSD Class II increments for PM-10 (there currently are no PSD increments for PM-2.5). As indicated in Table 4.1.2, the maximum increase in modeled 24-hour PM-10 concentration (2 $\mu g/m^3$) is 7% of the corresponding increment of 30 $\mu g/m^3$. The maximum increase in modeled annual PM-10 concentration (0.4 $\mu g/m^3$) is 2% of the corresponding increment of 17 $\mu g/m^3$. No modeling was performed at Lye Brook Wilderness Area (the nearest PSD Class I area about 200 miles to the east-northeast) where the change in Unit 4 plume height would have a negligible effect.

The SCREEN3 model was also used to predict the maximum downwind NH_3 concentration. Because NH_3 emissions would increase from near zero rather than remaining the same (as was assumed for particulate emissions), the location of maximum concentration was predicted to occur at a slightly different location, about 0.6 mile to the south-southwest of Greenidge Station in terrain at an elevation about 50 ft below the stack top elevation. The frequency of winds from the north-northeast (which would transport emissions to the south-southwest) is likely to be low (Figure 3.2.1). The maximum NH_3 concentration was predicted to be 0.02 $\mu g/m^3$ for a 1-hour averaging period. By comparison, the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL) for ammonia is 25 ppm (17,400 $\mu g/m^3$). RELs are time-weighted average (TWA) concentrations for up to a 10-hour work day during a 40-hour work week. The maximum predicted concentration is a negligible fraction of the REL.

No air dispersion modeling was performed for other pollutants. SO_2 and NO_x emissions from Unit 4 would decrease during the demonstration by about 95% and 65%, respectively (Table 2.1.1). These reductions are greater than the maximum increase in downwind concentrations predicted as a consequence of the decreased plume height (as obtained from the modeling of particulate emissions using SCREEN3). Specifically, because the SCREEN3 modeling indicated that the decreased plume height would increase downwind concentrations by a maximum factor of 2.5, emissions reductions of at least 60% (resulting in Unit 4 emissions during the demonstration of no more than 40% or original emissions) would result in no increase in concentrations at any downwind location (40% oof 2.5 equals 1). Consequently, a net improvement in air quality associated with SO_2 and NO_x concentrations would result. SO_3 emissions are expected to decrease by the same percentage as SO_2 emissions, with similar air quality improvement. The 95% reduction in Unit 4 emissions of HCl and HF would more than offset the increase associated with a lower plume height, and the reduction in Hg emissions of at least 60% would approximately offset the maximum increase. Because power plants are not large emitters of CO and VOCs (Table 2.1.1) and because there would be no change in emissions associated with the demonstration, these pollutants were not evaluated further. Because CO_2 is stable in the atmosphere and essentially uniformly mixed throughout the troposphere and stratosphere, CO_2 impacts resulting from no change in emission levels at Greenidge Station would also remain unchanged.

At times in the past, concerns have been raised about fugitive dust blown offsite from the Lockwood Landfill. The proposed project would not affect the frequency or severity of this type of occurrence, but planned increases in landfill height could increase the incidence of problems with fugitive dust. To reduce the generation of fugitive dust, the landfill operators have increased the wetting and compaction of fly ash and are implementing a new landfill operations plan designed to reduce wind exposure of active disposal areas (J.A. Daigler & Associates 2003).

4.1.3 Surface Water Resources

4.1.3.1 Construction

Construction activities for the proposed project would be limited to 3 acres of developed industrial property in the midst of the 153-acre Greenidge Station and adjacent to the existing powerhouse for Units 3 and 4. Because the area was previously graded and paved and currently serves as a parking lot, it is ecologically highly disturbed. The construction area does not encompass any existing body of water.

Construction of the proposed project would generate small amounts of both solid and liquid wastes including solvents, paints, coatings, adhesives, and empty containers. Existing facilities for containment and treatment of runoff and spills on the power plant site would be engaged to help prevent adverse effects on offsite surface waters. In addition, as necessary and appropriate, standard engineering practices for the prevention or minimization of runoff, erosion, and sedimentation from the construction site to offsite surface waters would be employed. The New York State Department of Environmental Conservation’s (NYSDEC’s) regulations and guidelines governing construction activities would be followed. Prompt containment and clean-up of accidental spills of harmful materials would be conducted in accordance with an appropriate spill prevention, control, and countermeasure plan and best management practices plan. Thus, project construction is not likely to have appreciable adverse effects on area surface waters.

4.1.3.2 Operation

The proposed project would not affect the quality or quantity of the liquid effluent from Greenidge Station, but somewhat more water would be withdrawn from Seneca Lake. The proposed project would require an additional 93 gpm of service water that would be consumed by operation of the lime hydrator and circulating dry scrubber rather than being returned to the lake. This additional water is slightly less than 20% of the plant’s current consumptive use, and represents only about 0.1% of Greenidge Station’s total water use (Section 2.1.6.2). Thus, adverse impacts on water quality and quantity in Seneca Lake would be negligible.

No additional wastewater would be generated from the proposed project. Accidental spills, if any, of ammonia from the storage tank for the SCR system would be prevented from reaching surface water by secondary containment. Wastewater effluents must be treated to meet the standards set forth in the State Pollutant Discharge Elimination System (SPDES) permit before being discharged to Seneca Lake. Hazardous wastes are removed from the site by a waste management contractor for disposal at an authorized facility. No measurable effects on the water quality of Seneca Lake would be expected.

Due to a reduction in air emissions (Section 2.1.7.1) of SO_2, NO_x, HCl, and HF (which are associated with acid deposition) and Hg (which adversely affects humans and biota), the proposed project would have a slight beneficial effect on area surface waters.

4.1.4 Geological Resources

4.1.4.1 Rock, Soils, and Mineral Resources

Construction for the proposed project would not affect the availability or accessibility of rock or mineral resources. Only limited excavation is expected, and any excavated material probably would be used within the project as fill. Sand and crushed stone that would be used in construction are readily available in the region, and requirements for these materials would be modest due to the modest size of the new facilities. No agricultural soils would be removed from potential production. Construction of new facilities would not preclude future access to any undiscovered natural gas that might be present deep underground.

Due to low topographic relief and the previous excavation of the project site (Section 3.4.1), little soil erosion would be expected during construction. Erosion of exposed surfaces and soil stockpiles would be limited through standard management practices, consistent with requirements of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (NYSDEC 2003c).

The lime required for operation of the proposed project, which would be acquired commercially, would be produced from limestone, which is an abundant resource in the surrounding region. Glacial till soil for construction and capping of the Lockwood Landfill also is abundant in the area and can be obtained from land adjacent to the landfill.

4.1.4.2 Groundwater

The proposed project would not affect any uses or users of groundwater. No uses of groundwater occur in the site vicinity, and the project also would not use groundwater as a water source for project construction or operation. Temporary dewatering of excavations during construction activities might collect some groundwater in addition to stormwater runoff, but because permeability is low the amounts would be small and any changes in the water table would be very localized.

Disposal of waste generated by the proposed project (Section 4.1.7.2) would be unlikely to affect groundwater quality because the waste would be placed in an engineered landfill that is lined and equipped with a leachate collection system. If leachate were to reach groundwater (e.g., due to a leak in a landfill liner), periodic sampling of groundwater monitoring wells downgradient from the landfill should detect it. Contaminant migration would be slow, so any needed remedial measures could be implemented in time to prevent contaminants from migrating to surface water or sites where water is used. Past waste disposal has affected the quality of groundwater collected in underdrains beneath older portions of the Lockwood Landfill that are not lined, but this water does not remain in the ground, and contaminant migration has not been detected in downgradient monitoring wells (Section 3.4.4). Eventual landfill closure would extend hydrological controls to older portions of the landfill, thus reducing the potential for old waste disposal to affect groundwater over the long term (Section 4.1.7.2).

4.1.4.3 Geological Hazards

Because only minimal geologic hazards are associated with the proposed project site (Section 3.4.2), geologic conditions would be unlikely to contribute to adverse impacts from or to the proposed project.

4.1.5 Floodplains and Wetlands

4.1.5.1 Floodplains

The entire proposed project site would be located outside the 500-year floodplain of Keuka Lake Outlet and Seneca Lake. Therefore, neither construction nor operation of the proposed project would have adverse impacts on the Keuka Lake Outlet and Seneca Lake floodplain.

4.1.5.2 Wetlands

Construction and operation of the proposed project would have no adverse effects on wetlands because none are present on or adjacent to the project location. Runoff and spills from the site would not reach wetlands due to use of measures discussed in Sections 4.1.3.1, and 4.1.3.2.

Because operation of the proposed project would reduce Hg emissions, a slight benefit to area wetlands would be provided by reducing Hg deposition and potential build-up of Hg levels in wetlands and the ecological communities they support.

4.1.6 Ecological Resources

4.1.6.1 Terrestrial Ecology

Because the proposed project would be located in an area that is highly disturbed and completely industrialized (predominantly a parking lot), and that supports almost no native plant or animal communities, neither construction nor operation of the proposed facility would adversely affect terrestrial ecological resources.

Due to NH_3 injection into flue gas to control NO_x emissions, NH_3 emissions would increase from near zero to about 280 lb per year (Section 2.1.7.1). This NH_3 would be widely dispersed and ultimately deposited to terrestrial and aquatic ecosystems through dry and wet deposition. Wineries, such as those in the local area, typically use nitrogen-based fertilizer at about 10 to 40 lbs per acre per application (Penn State 2002). Any fertilization effect from the NH_3 emissions due to the proposed project would be miniscule due to the constant slow rate of emission (less than 1 lb per day) and large dispersal area. For example, if 20 lb of NH_3 fertilizer per acre were applied once per year to the 10,414 acres of vineyards in the Finger Lakes Region (Uncork New York 2004), then the NH_3 emissions from the proposed project would represent only about 0.14% of the total from vineyards, not considering other agricultural uses in the area.

Operation of the proposed project would reduce Hg emissions and provide a slight benefit to terrestrial ecosystems in the area by reducing Hg deposition and potential build-up of Hg levels in soils, water, and biota.

4.1.6.2 Aquatic Ecology

Because appropriate engineering practices for (1) preventing or minimizing runoff, erosion, and sedimentation from the project site to offsite surface waters, and (2) the prompt containment and clean-up of accidental spills would be implemented, construction of the proposed project would have negligible impacts on the fish, birds, and wildlife of Seneca Lake and Keuka Lake Outlet (Section 4.1.3)

During operation of the proposed project, Seneca Lake's biota would be negligibly affected by the potential 93-gpm reduction of return water. Similarly, the biota would be negligibly affected by the project's NH_3 emissions (Section 4.1.6.1).

Because operation of the proposed project would reduce Hg emissions, a slight benefit to aquatic ecosystems in the area would be provided by reducing Hg deposition and potential build-up of Hg levels in sediments and water.

4.1.6.3 Threatened and Endangered Species

Federal- and state-listed threatened and endangered species (Section 3.6.3) are not known to occur, and are unlikely to occur, on the proposed project site due to its highly disturbed nature. Any effects of the proposed project on threatened and endangered species would likely be marginally beneficial as a result of expected reductions in Hg, NO_x, SO_2, HCl, HF, and particulate emissions.

In compliance with Section 7 of the Endangered Species Act of 1973, as amended, DOE requested consultation with the U.S. Fish and Wildlife Service (FWS) regarding potential impacts of the proposed project on threatened and endangered species (Appendix A). The FWS response indicated that, except for occasional transient individuals, no federal-listed species or critical habitat for such species are known to exist in the project impact area, and that no further Endangered Species Act coordination or consultation with FWS is required (Appendix A).

4.1.6.4 Biodiversity

Given adequate collection and treatment of runoff during construction and operation of the proposed project, neither of these activities would adversely affect biodiversity of the surrounding ecosystems. Both local and far-field biological diversity might realize a net beneficial, but probably immeasurable, effect as a result of expected reductions in Hg, NO_x, SO_2, HCl, HF, and particulate emissions.

4.1.7 Waste Management

4.1.7.1 Construction

Construction of the proposed project would generate solid wastes in types and amounts typical of construction projects. Wastes would include packaging from materials transported to the site, scrap materials, metals and other materials from dismantling the existing Unit 4 ESP, and demolition debris from removal of the existing waste oil storage shed and the parking lot surface. Metal waste would be sold as scrap. Some dismantled building material would probably be used on the site as fill material. The remaining solid wastes would be transported for disposal in one of the municipal landfills serving the region (Section 2.1.7.3). The volume of landfilled waste would be very small in comparison with the capacity of the 387-acre Ontario County landfill, which is permitted to accept 624,000 tons [approximately equivalent to 624,000 cubic yards (yd^3)] per year of municipal solid waste and has a potential total capacity of over 21 million yd^3 (Casella Waste Systems, Inc. 2003). The disposal of project construction waste would not measurably affect that landfill's potential operating life.

4.1.7.2 Operation

The proposed project would increase the quantity of fly ash generated by Greenidge Station by about 50%, from the current 59,000 tons per year to an estimated 89,000 tons per year (Table 2.1.1). Fly ash generation from Unit 4 would increase annually from 40,000 tons to 70,000 tons. This increase would result almost entirely from (1) the use of lime in the CDS system and (2) the enhanced capture of fine particles (including calcium sulfate and calcium sulfite formed from SO_2 reacting with the calcium in lime). The enhanced capture would occur because the CDS agglomerates fine particles into coarser material that would be collected in a new ESP or baghouse. Minor increases in volume would result from the activated carbon used in the CDS system. The proposed project would not affect Greenidge Station's generation of bottom ash or the subsequent use of this material (Section 2.1.7.3).

Fly ash generated in project operation would have somewhat different characteristics than the fly ash currently generated by Greenidge Station. The facility's current fly ash is a mixture consisting primarily of mineral ash and a small amount of unburned carbon that is captured with the fly ash. Fly ash from the proposed project would include these same constituents, with the addition of lime and other calcium compounds formed from the lime, powdered activated carbon, and increased amounts of sulfate compounds and other materials removed from air emissions. Project participants would characterize this material physically and chemically, and would investigate possible opportunities for beneficial reuse. Leaching tests would be done, in part to evaluate the stability of trace constituents of coal (such as Hg) incorporated in the ash and to verify that the material is not a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA).

Beneficial reuse of some or all of the fly ash from the proposed project would reduce the need for landfill disposal and could reduce demands for other materials that the fly ash replaces. Although fly ash is commonly used as a cementitious material in concrete, this is not likely to be an option for fly ash from the proposed project. The fly ash currently generated at Greenidge Station contains too much unburned carbon to be suitable for this purpose, and ash waste from the proposed project can be expected to have similar limitations. However, because it would contain substantial amounts of lime and other calcium compounds, the fly ash from the proposed project might be suitable for use as a soil amendment, probably after mixing it with treated sewage sludge. Project participants have identified a potential customer for this material and estimate that up to 20,000 tons per year could be used for this purpose. Other potential uses also would be explored.

If not beneficially reused, fly ash from the proposed project would be transported to the Lockwood Landfill for disposal. The ash would be commingled with fly ash from Unit 3 and other solid wastes generated in minor quantities at Greenidge Station. The 143-acre Lockwood Landfill site has been used for disposal of Greenidge Station fly ash and related wastes since 1979. In 2003, the site was calculated to have a potential remaining waste disposal capacity of 3.3 million yd^3 (J.A. Daigler & Associates 2003). This calculation forms an upper bound for remaining capacity because it assumes full site utilization, a final maximum elevation of 785 ft above mean sea level (approximately 85 ft above the current peak elevation), NYSDEC approval of future disposal designs, and continued renewal of the facility's 5-year permits. By using this calculation with current waste generation rates and assuming a waste density of one ton per yd^3, an estimate is derived that the site could accommodate Greenidge Station wastes through 2057. If all of the waste from the proposed project were landfilled, resulting in a 50% increase in waste volume beginning in 2006, the landfill would reach capacity about 17 years sooner (in 2040). Even with less optimistic assumptions about landfill capacity, it is apparent that the landfill site could accommodate fly ash from the proposed project until well beyond the 12-month demonstration period of performance testing and monitoring (see Section 5 regarding landfill sufficiency over the period of commercial operation).

Landfill disposal of ash has the potential to affect groundwater and surface water as a result of leaching of landfilled fly ash. Leachate generated within the Lockwood Landfill drains to the leachate collection system within lined portions of the landfill and to groundwater underdrains below unlined portions. These drains discharge by gravity flow to the adjacent sedimentation pond, which also receives surface water runoff from the landfill area. No active water treatment processes are employed in this pond, but suspended material and some dissolved contaminants (such as iron and manganese) settle out of the water. A few times each year, water from the pond is pumped to Keuka Lake Outlet after sampling and analysis have ascertained that the water quality meets the requirements of the SPDES discharge permit. If permit requirements were not met, water could be treated before being discharged. Monitoring data from a discharge event in 2003 (Table 4.1.3) show that the quality of the water in the pond easily met all of the permit requirements.

Changes in the composition of the Unit 4 fly ash due to the proposed project could affect the chemistry of Lockwood Landfill leachate and thus of discharges to Keuka Lake Outlet. Monitoring of Lockwood Landfill leachate done as part of the landfill groundwater monitoring program found elevated levels of several constituents (Table 4.1.4). Total dissolved solids in the leachate were much higher than in background groundwater (Section 3.4.4). The principal dissolved ions in the leachate were calcium, magnesium, and sulfate. Other dissolved substances found in elevated concentrations are commonly found in coal or pyrite, which is one of the minor waste streams codisposed with ash in the Lockwood Landfill. Most samples were similar to the groundwater with neutral to slightly alkaline pH, but one sample had a slightly acidic pH of 5.9. Because the ash from the proposed project would be similar to the ash currently generated, but with higher levels of calcium and sulfate compounds, the overall chemical character of the leachate would not be changed, but there could be higher concentrations of calcium and sulfate. These substances are not likely to settle out in the sedimentation pond, so they probably would be discharged to Keuka Lake Outlet. Calcium and sulfate are not toxic and there are no permit limits for these substances in pond discharges. Any effects on water quality would be dissipated by dilution in the stream and in Seneca Lake.

Increased removal of Hg in plant emissions would lead to increased Hg concentrations in Greenidge Station fly ash. Research on leaching of Hg from fly ash indicates that there should be negligible effects on Hg levels in Lockwood Landfill

Table 4.1.3. State Pollutant Discharge Elimination System (SPDES) permit limits and reported values for discharge from the Lockwood Landfill sedimentation/neutralization basin

Effluent parameter	Discharge limit (daily maximum value)[a]	Value measured in November 2003 discharge event[b]
Flow (gallons/day)	250,000[c]	178,571
Aluminum (total; mg/L)	2.4	<0.05
Cadmium (total; mg/L)	0.11	<0.005
Copper (total; mg/L)	1.0	<0.01
Iron (total; mg/L)	4.0	0.1
Zinc (total; mg/L)	2.0	<0.01
Mercury (total; mg/L)	0.0008[d]	<0.0002
Manganese (total; mg/L)	3.0	0.02
Total suspended solids (mg/L)	50	<4
Arsenic (total; mg/L)	0.1	<0.02
Selenium (total; mg/L)	0.07	0.01
pH (pH units)	range: 6.0 to 9.0	8.1

[a]New York State Department of Environment and Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) Discharge Permit Number NY-1007069, AES Greenidge, L.L.C.: Lockwood Disposal Facility, Modification Date June 7, 1999.

[b]AES Greenidge, “AES Eastern Energy NPDES/SPDES Discharge Monitoring Reports,” Eileen Reynolds, December 16, 2003. Total volume of discharge, which occurred over a period of several days, was about 1.5 million gallons.

[c]Maximum flow shall not exceed 140,000 gallons/day if stream flow measured in Keuka Lake Outlet at Dresden is less than 27 ft^3/sec.

[d] Modified from 0.002 mg/L to 0.0008 mg/L, in accordance with NYSDEC letter of July 22, 2004. See Appendix C.

leachate. Leachability testing of ash from three projects that demonstrated the use of activated carbon injection for Hg control found low rates of Hg release (Senior et al. 2003). Hg concentrations in waste extracts generated with the Toxicity Characteristic Leaching Procedure (TCLP), which is prescribed in regulations under RCRA and is designed to mimic leaching conditions in a municipal solid waste landfill, ranged from undetectable (less than 0.00001 mg/L) up to 0.00007 mg/L. Values obtained with the Synthetic Groundwater Leaching Procedure (SGLP), which is more representative of conditions in most coal ash landfills, ranged from undetectable (less than 0.00001 mg/L) up to 0.00005 mg/L. All reported Hg concentrations were well below potentially applicable criteria, including the primary drinking water standard of 0.002 mg/L, water quality criteria for protection of aquatic life (0.0014 mg/L for acute exposure and 0.00077

Table 4.1.4. Selected data from monitoring of leachate collection drains at Lockwood Landfill during 2002

Parameter	Highest level reported during 2002[a]
Total dissolved solids (mg/L)	3330
Alkalinity (mg/L)	493
Hardness (mg/L)	1687
Aluminum (total; mg/L)	7.1
Boron (total; mg/L)	20.5
Calcium (total; mg/L)	519
Iron (total; mg/L)	79
Manganese (total; mg/L)	2.2
Magnesium (total; mg/L)	105
Selenium (total; mg/L)	0.2
Sulfate (mg/L)	2280
pH (pH units)	5.9 to 8.3[b]

[a]Data included in Criss 2004.

[b]Range of values reported.

mg/L for chronic exposure; EPA 2002), and the threshold for identifying a material as a hazardous waste (0.200 mg/L). Only one ash source in the study produced extracts with detectable Hg concentrations. That ash had total Hg concentrations ranging from 0.2 to more than 0.5 µg/g (200 to more than 500 ppb). Given these values and the 20-fold dilutions used in the leachability tests, the highest measured extract concentrations indicate release of somewhere between one-five-hundredth and one-fourteenth of the Hg in the ash. If treated effluents containing similar leachates were discharged to Keuka Lake Outlet, no violation of water quality standards would result. Other research has found that leaching of Hg from fly ash is dependent on pH, with greater releases occurring at lower (acidic) pH (Schroeder et al. 2003). Thus, the slightly alkaline pH of natural waters at the Lockwood Landfill site could limit Hg release.

The proposed project would not change the requirements and eventual process for closure and post-closure care of the landfill. Final cover would be placed over the entire facility to limit infiltration and thus reduce future leaching of the waste. The multilayer final cover would consist of a low-permeability synthetic membrane layer overlain by a permeable geosynthetic drainage layer and a protective soil layer at least 2 ft thick. Closure of the Lockwood Landfill would be expected to include final covering of old unlined waste areas, thus reducing potential future impacts from the entire facility. Post-closure care would be provided for a 30-year period, as mandated under NYSDEC permitting requirements for landfills.

4.1.7.3 Hazardous Waste

Operation of the proposed project's SCR system could result in generation of a hazardous waste. Catalysts used in the SCR process lose their reactivity over time and would need to be replaced or regenerated after about 3 years. No catalyst replacement or regeneration is expected during the 12-month demonstration period (see Section 5 regarding catalyst replacement over the period of commercial operation).

Construction and operation of the proposed project would not be expected to introduce any other new hazardous wastes that are not already generated by operation of Greenidge Station. However, the amounts of paint, solvents, and lubricants used, recycled, or transported for disposal could increase slightly. Existing Greenidge Station hazardous waste handling and disposal procedures would be employed for the proposed project (Section 2.1.7.4).

4.1.8 Cultural Resources

In compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, DOE requested a consultation with New York's State Historic Preservation Officer (SHPO) regarding a determination of the potential for impacts associated with the proposed project on any historic resources that may be listed in or eligible for the *National Register of Historic Places* or that may have local importance (Appendix B).

Impacts from construction and operation of the proposed project are not likely, however, because the project site has been disturbed since the 1950s, no cultural resources have been reported or found on or near the project site, and the two *National Register* properties closest to the project site are about 0.5 mile to the northwest.

4.1.9 Socioeconomic Resources

The socioeconomic impacts of the proposed project would be most noticeable during the 12-month construction period, especially when the peak construction work force (100 to 150 workers) would be on the site. Because existing personnel would continue to operate Greenidge Station during demonstration of the proposed project, no additional influx of additional workers during project operations would result.

In addition to the 100 to 150 direct jobs that would be created by project construction, a number of indirect jobs could be created as a result of the purchases of goods and services by the project participants and construction workers. Employment multipliers developed for the state of New York indicate that each direct construction job leads, on average, to the creation of 1.57 indirect jobs (DARME 1996). However, this employment multiplier is likely to be too high for the proposed project because of the short construction period (12 months) and the probability that few construction workers would relocate to the area permanently. So, this analysis assumes a lower employment multiplier of 1.00 (i.e., 1 indirect job for every 1 direct job). Given this assumption, roughly 100 to 150 indirect jobs could be created during the peak construction period, for a total of roughly 200 to 300 new jobs in the project area (100 to 150 direct jobs plus 100 to 150 indirect jobs). The following subsections discuss the potential socioeconomic impacts of the proposed project, particularly those associated with this direct and indirect employment.

4.1.9.1 Population

The construction work force would be expected to come from outside the immediate project area and would either commute from their homes to the project site daily or stay temporarily in area hotels and motels (CONSOL 2002). To account for these two types of workers, this analysis assumes that 50% of the peak construction work force (50 to 75 workers) would commute from home daily, while another 40% (40 to 60 workers) would stay temporarily in hotels or motels. Although it is not likely that many of the construction workers would relocate to the project area permanently (i.e., for longer than the 12-month construction period), this analysis assumes as a conservative estimate that 10% of the peak work force (10 to 15 workers) would relocate permanently.

Past experience with large, multi-year power plant construction and refurbishment projects indicates that approximately 60% of the in-migrating work force is accompanied by family, while the remaining 40% is not (NRC 1996). However, for this relatively small, 12-month construction project, it is more reasonable to expect that none of the workers staying temporarily in hotels or motels would be accompanied by family, and that only 40% of the workers relocating permanently (4 to 6 workers) would be accompanied by family.

Assuming that 4 to 6 workers would relocate permanently with their families, and assuming the average household size of 2.61 persons for the state of New York (U.S. Census Bureau 2004b), the permanent population in the project area would increase by roughly 10 to 16 residents as a result of direct employment. The indirect jobs that could be created would be less specialized than the direct construction jobs, and would be even more likely to be filled by existing area residents. Accordingly, this analysis assumes that none of the indirect work force would relocate to the project area during the construction period.

Combining the population growth that would occur due to workers staying in the area temporarily without families (40 to 60 workers), workers relocating permanently without families (6 to 9 workers), and workers relocating permanently with families (4 to 6 workers, with 6 to 9 family members), the peak construction period would result in roughly 56 to 84 additional residents in the project area. This population growth would represent roughly 0.2% to 0.3% of Yates County's population of 24,621. The potential impacts of this population growth are discussed below in Sections 4.1.9.3 (Housing) and 4.1.9.4 (Water and Wastewater Services).

4.1.9.2 Employment and Income

The 200 to 300 total new jobs (100 to 150 direct jobs plus 100 to 150 indirect jobs) that could be created during the peak construction period would represent less than 2.5% of the total labor force in Yates County in 2000. Although the direct jobs would go to workers from outside the immediate project area, most (if not all) of the indirect jobs would go to existing residents in Yates and Ontario counties. Because existing personnel would continue to operate Greenidge Station during demonstration of the proposed project, no new employment would be associated with project operations. Accordingly, construction of the proposed project would have a temporary positive effect on local employment by creating indirect jobs, but gains in local employment would likely be lost following completion of project construction.

Because the construction work force would come from outside the immediate project area, construction wages would not have a large effect on total or per capita income in Yates County. However, the wages paid to existing area residents through indirect jobs created during the construction period would have a small positive effect on total and per capita income.

4.1.9.3 Housing

The 10 to 15 new construction-related households (i.e., the households of workers relocating permanently with and without families) assumed as an upper bound in this analysis would represent less than 0.5% of the 3,035 vacant housing units in Yates County in 2000. This level of increased demand is not likely to have an adverse effect on the availability or cost of housing in Yates County.

Because many of the construction workers would stay in area hotels and motels, the availability and cost of tourist lodging in the summer season could be a larger issue than that of housing the construction workers who relocate permanently. The hotels and motels themselves are not likely to lose business, as they could rent rooms to the construction workers, but the wineries, restaurants, and other local businesses that rely on tourism could be adversely affected if tourists are not able to find lodging in the area. However, given the large number of tourist lodging facilities in the area, the short duration of the construction period, and the fact that some of the construction work would occur outside the tourist season, this economic impact is expected to be relatively minor.

4.1.9.4 Water and Wastewater Services

Because many of the 100 to 150 workers expected during the peak construction period would stay in the project area temporarily in hotels and motels or permanently as new residents, there would be additional demand for water and wastewater services. As discussed in Section 3.8.4, the Penn Yan water treatment facility has excess capacity of 0.97 MGD. This excess capacity would be more than enough to meet the additional demand for water associated with the peak construction work force.

The Penn Yan wastewater treatment facility has excess capacity of 0.8 MGD (Section 3.8.4), which also would be more than enough to meet the additional wastewater needs associated with the peak construction work force. However, the need to provide additional wastewater services for the construction workers could slightly exacerbate existing problems with the Penn Yan wastewater treatment system during periods of high groundwater flow (Section 3.8.4).

4.1.9.5 Local Government Revenues

Because pollution control equipment is exempt from property taxation in the state of New York, the proposed project would not add to the assessed value of the existing Greenidge Station for property tax purposes and would not result in additional property tax revenues for Yates County.

In addition to the New York state sales tax rate of 4.25%, Yates County and Ontario County have local sales tax rates of 4.0% and 3.0%, respectively (NYSDTF 2004). Therefore, local purchases of materials for project construction and local purchases of goods and services by construction workers would result in some additional sales tax receipts for the counties. However, the overall effect of these revenue increases for local governments would be relatively minor because of the limited local purchases of materials, moderate number of construction workers (100 to 150 workers during the peak construction period), and limited period of construction (Section 2.1.4).

4.1.9.6 Environmental Justice

As discussed in Section 3.8.6, the percentages of residents classified as "minority" in Yates County (3.2%) and Census Tract 9901 (4.4%) are much lower than the minority percentages of the United States (30.9%) and the state of New York (38.0%). Therefore, the impacts of constructing and operating the proposed project would not be distributed disproportionately to a minority population.

The percentage of residents classified as "below poverty" in Yates County (13.1%) is also lower than that of the state of New York (14.6%), but slightly higher than that of the United States (12.4%). Also, the percentage of residents classified as below poverty in Census Tract 9901 (15.2%) is higher than that of Yates County, the state of New York, and the United States (Section 3.8.6). However, because the percentages below poverty for Census Tract 9901, Yates County, and the state of New York are all within 2.1 points, it does not appear that Census Tract 9901 constitutes a "poverty" population that would be disproportionately affected by the proposed project. Further, many of the potential impacts associated with the proposed project would be beneficial rather than adverse (e.g., an overall improvement in air quality).

4.1.10 Transportation and Noise

4.1.10.1 Transportation

Roads

The 100 to 150 direct workers expected during the peak construction period would access the project site using Lampman Road from State Highway 14. For this assessment, most of the construction workers were assumed to carpool to and from the project site each day (either from their homes or from hotels and motels), and the average vehicle was assumed to carry two workers (CONSOL 2004b). Thus, as an upper bound, about 150 additional vehicles trips (75 roundtrips to and from the site) would be generated each day by the construction workers.

As discussed in Section 3.9.1.1, ADT on the segment of Highway 14 near Greenidge Station was 2,595 vehicles in 2003, or about 10% of the highway's capacity. The estimated 150 additional vehicle trips that would result from construction workers driving to and from the project site each day would represent about a 5.8% increase over existing traffic. By itself, this small increase is not expected to create an appreciable impact on the overall level of service on Highway 14.

However, because the additional trips would occur at approximately the same time each morning and evening, there could be slight impacts to traffic flow and safety on Highway 14 and Lampman Road during peak drive times, which could be exacerbated if they would coincide with summer tourist traffic on Highway 14 and with delivery trucks using Highway 14 and Lampman Road to access Greenidge Station. Traffic flow would be monitored during the construction period to determine if actions (e.g., scheduling the arrival and departure times of workers in 15-minute shifts) would be appropriate to avoid traffic congestion.

Traffic flow and safety on Highway 14 and Lampman Road could also be affected by additional truck trips to and from the project site during construction. Currently, about 20 trucks access Greenidge Station per **week**. During the peak construction period, especially during concrete foundation pouring, up to 15 additional trucks would enter the project site per **day** (CONSOL 2004a). Traffic flow would be monitored during the construction period to determine if actions (e.g., scheduling truck deliveries to avoid construction workers' arrival and departure times) would be appropriate to avoid traffic congestion.

During demonstration of the proposed project, approximately three fewer truckloads of coal would be delivered to Greenidge Station each day (Section 2.1.6.3). This decrease in truck traffic would be offset by new truck traffic: three truckloads of lime that would be delivered each day and much less frequent deliveries of ammonia and powdered activated carbon (CONSOL 2004a). These new deliveries would have a negligible impact on traffic flow and safety on Highway 14 and Lampman Road.

Disposal of fly ash generated by the proposed project would increase the number of daily truck trips between Greenidge Station and the landfill from the current 6 trips to 9 trips. Because all travel would be on private roads, the increase would not affect local highway users.

Rail

Rail shipments to Greenidge Station would not increase during project construction because all construction equipment and materials would be delivered by truck (CONSOL 2004a). As discussed in Section 2.1.6.3, rail shipments during project demonstration would increase annually by about 2 trains of 100 rail cars each to offset about 850 loads of coal no longer delivered by truck (CONSOL 2004a). The impact of the increased train traffic would be negligible.

4.1.10.2 Noise

Noise levels are related to the magnitude of air pressure fluctuations that cause the eardrum to oscillate, thereby stimulating the auditory system. The magnitude of these pressure fluctuations is typically expressed as the Sound Pressure Level (SPL), which is measured in dB. By definition, the threshold of human hearing is 0 dB. Background levels at a recording studio are as low as 15 dB, conversational speech at the location of the listener is around 60–65 dB, and a jet takeoff is in the range of 120 dB at a distance of about 100 ft from the runway. The human threshold of pain, where the brain receives a signal to reduce the SPL or risk damage to the auditory system, begins at around 130 dB for most individuals. SPL is reduced by about 6 dB for each doubling of distance from an individual source.

Sound typically occurs over a wide spectrum of frequencies. For most applications, dB levels are determined by weighting the frequencies (i.e., some frequencies count more than others). The so-called “A weighting,” which was developed to approximate the way in which the human ear responds to the various frequencies, is typically expressed as dB(A).

EPA (1974) recommends a day-night level of 55 dB(A) or less to protect the public from activity interference and annoyance in typically quiet outdoor and residential areas. Day-night average sound level is defined as the 24 hour average sound level, in dB(A), obtained after the addition of 10 dB(A) to sound levels in the night from 10 p.m. to 7 a.m. Maintaining relatively continuous noise below this level also protects against hearing loss, although less stringent requirements are typically set for that purpose. From about 10:00 p.m. to 7:00 a.m., background noise is typically reduced due to the absence of the usual noise sources during daytime hours (e.g., vehicular traffic, lawn mowers, work activities, and recreational activities); consequently, noise at around 50 dB(A) becomes more noticeable and can be annoying. Therefore, 45 dB(A) is the level for potential activity interference and annoyance during the nighttime hours specified above.

During construction of the proposed project, the principal sources of noise would be from construction equipment and material handling. The amount and type of construction equipment would vary depending on the specific construction activity occurring at that time. Construction activity would primarily occur within 3 acres of the 153 acres occupied by Greenidge Station. The proposed project area is currently confined by the power plant building, the ramp from the upper parking lot, the short railroad bridge connecting the upper parking lot and the power plant building and the access road to the upper parking lot. The upper parking lot, which is about 30 ft above the main construction site, would be utilized as an equipment laydown area. An existing waste oil storage shed on this property would be relocated and the building torn down to make room for new equipment. The existing booster fan at the base of Unit 4 stack would be replaced by two larger units. The existing ESP would be replaced, and the new buildings [i.e., circulating dry scrubber (CDS) vessel, two ash recycling bins, lime storage silo, lime hydrator, powder activated carbon storage silo, ammonia (NH_3) storage tank system], and ancillary equipment would be erected on this land. The main construction, staging and fabrication areas would be expected to be located between existing structures and not located in proximity to sensitive noise receptors.

During construction, employees and contractors would be responsible for ensuring that exhaust mufflers and engine enclosures are in place and in good working order for all industrial trucks and other pieces of construction-related equipment. An exhaust muffler is a device that deadens the noise of escaping gases or vapors through which the exhaust gases of an internal-combustion engine are passed. An engine enclosure silences low frequency noise radiated from the engine. Exhaust mufflers and engine enclosures are commonly used, and are commercially available from many different manufacturers. All construction equipment would be properly maintained.

During operation of the proposed project, the principal interior sound sources would be the in-duct Selective Catalytic Reduction (SCR) unit, the hydrator, the circulating dry scrubber vessel, the carbon storage and injection system, and the electrostatic precipitator. Specifically, sound sources would include a water pump, hydrator feed system, air blowers, mechanical electrostatic precipitator rappers, two large booster fans, and various control valves. These sound sources would be enclosed and acoustically insulated. Noise sources within the buildings would be fitted with sound-attenuating enclosures or other noise dampening measures that would meet all state and federal regulations and AES’ noise standards. New equipment would operate at noise levels less than 85dB(A) at 3 ft from the base of the equipment (Scandrol 2004). During maintenance/repair events, workers would be required to wear hearing protection equipment.

There is no residential population within a quarter mile of the proposed project (Section 3.9.2). Due to planned noise attenuation measures, natural and man-made terrain features, and distance to the nearest residences, no perceptible change in noise associated with the proposed project would be expected. Therefore, the proposed project would be unlikely to increase noise levels perceptibly at the nearest residences or other offsite locations.

4.1.11 Electromagnetic Fields

Over the past two decades, some members of the scientific community and the public have expressed concern regarding human health effects from electromagnetic fields (EMF) during the transmission of electrical current from power plants. Despite efforts by the scientific community and research funding from governmental agencies and private organizations, the issue is still clouded with much uncertainty. The scientific evidence suggesting that EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer, childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults (NIEHS 1999). EMF exposure cannot be recognized as entirely safe because of this evidence, even though the evidence does not clearly demonstrate a cause and effect relationship between EMFs and human health effects. Virtually everyone in the United States uses electricity and is exposed to EMFs; therefore, a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures is prudent.

For the proposed project, no additional sources of EMF such as new transmission lines would be required and, as a result, no perceptible changes to existing EMF levels would occur. Consequently, EMF-related health effects, if present, would be unchanged and small (NRC 1997).

4.1.12 Human Health and Safety

The proposed project would be subject to the OSHA General Industry Standards (29 CFR Part 1910) and the OSHA Construction Industry Standards (29 CFR Part 1926). During construction and operation of the proposed project, risks would be minimized by Greenidge Station's adherence to procedures and policies required by OSHA, the state of New York, and AES. These standards establish practices, chemical and physical exposure limits, and equipment specifications to preserve employee health and safety.

Construction activities would comply with OSHA Construction Industry Standards (29 CFR Part 1926). Construction permits and safety inspections would be employed in an effort to minimize the frequency of accidents and further ensure worker safety. Construction equipment would be required to meet all applicable safety design and inspection requirements, and personal protective equipment would meet regulatory and consensus standards.

Potential health impacts to workers during construction of the proposed project would be limited to normal hazards associated with construction (i.e., no unusual situations would be anticipated that would make the proposed construction activities more hazardous than normal for a major industrial construction project). Most accidents in the construction industry result from overexertion, falls, or being struck by equipment

(NSC 2003). Construction-related illnesses would also be possible (e.g., exposure to chemical substances from spills).

Following construction of the proposed project, the total number of permanent employees needed to operate the facilities would not change (Section 2.1.4). To maximize worker safety, operations would be managed from a control room. All instruments and controls would be designed to ensure safe start-up, operation, and shut down. The control system would also monitor operating parameters and perform reporting functions. Control stations would be placed at remote locations at which operator attention would be required. Therefore, the overall design, layout, and operation of the facilities would minimize human hazards. Compliance with the Federal Occupational Safety and Health Standards, as well as safety standards specified by the state of New York and AES, would help maintain occupational safety at Greenidge Station. No substantial differences with respect to occupational safety or industrial hygiene would be expected between current operations and those of the proposed project. Thus, the occupational safety and health experience would not be expected to change as a result of the proposed operations.

Greenidge Station and AES would develop supplemental detailed procedures for inclusion in the plant's Occupational Safety and Health Program to assure compliance with OSHA and EPA regulations and serve as a guide for providing a safe and healthy environment for employees, contractors, visitors, and the community. These procedures would include job procedures describing proper and safe manners of working within the facilities, appropriate personal protective equipment (PPE) and hearing conservation protection devices (e.g., handling/storage of NH_3 would comply with CFR 1910.111 Hazardous Materials, Storage and handling of anhydrous ammonia; PPE would comply with CFR 1910.132, etc.). The manual would be used as a reference and training source and would include accident reporting and investigation procedures, emergency response procedures, gas rescue plan procedures, hazard communication program provisions, material safety data sheets, medical program requirements, and initial and refresher training requirements. In addition, supplemental provisions would be added to the plant's Contingency Plan for Hazardous Waste, Spill Prevention Control and Countermeasures Plan, Hazard Substances Response Procedures, and Air Pollution Emergency Episode Plan.

Potential health impacts to the public from the proposed project would include fugitive dust emissions typical of construction sites (Section 4.1.2.1) and operational combustion emissions from the proposed project (Section 4.1.2.2). Because ambient air quality standards are designed to protect public health with an adequate margin of safety (Section 3.2.2), continued attainment of air quality standards during construction and operation of the proposed project (Section 4.1.2) indicates that impacts to public health would be minimal.

4.2 POLLUTION PREVENTION MEASURES

Table 4.2.1 lists the pollution prevention measures that the project participants would provide during construction and operation of the proposed project. In addition, the project itself would demonstrate technologies to reduce air emissions. Specifically, the project would integrate a single-bed selective catalytic reduction (SCR) system for NO_x control and a circulating dry scrubber (CDS) for SO_2, Hg, HCl, HF, and SO_3 control.

Table 4.2.1. Pollution prevention measures developed for the proposed project at Greenidge Station

Environmental Issue	Pollution prevention measure
Water quality	Follow standard engineering practices to prevent or minimize runoff, erosion, and sedimentation on and near the construction site (e.g., silt fences, berms, liners and cover materials as necessary).
	Ensure prompt containment and clean-up of accidental spills of construction materials such as solvents, paints, oil and grease, and hazardous substances in accordance with an appropriate spill, prevention, control, and countermeasure plan and best management practices plan.
Waste disposal	Investigate opportunities to reduce waste disposal requirements by finding beneficial uses for fly ash generated by the proposed project.
	Conduct leach testing of the fly ash prior to disposal to provide opportunities to modify the waste form to limit the potential release of contained Hg.
	Regenerate or recycle spent catalyst from the selective catalytic reduction (SCR) system, rather than transporting this material for disposal.
	Investigate the impact of process parameters on SCR catalyst life and adjust these parameters to minimize degradation of SCR catalyst, thus reducing the frequency of replacement or regeneration.
Noise	Ensure that all construction equipment (e.g., exhaust mufflers, engine enclosures, etc.) is in good working order, properly maintained, and lubricated.
	Use air inlet silencers on the project's small blower units.
	Fit the ash handling system exhauster with an exhaust silencer (i.e., muffler) and operate the system intermittently.
	Equip delivery trucks with properly maintained mufflers.
	Acoustically insulate the structure enclosing the proposed ESP or baghouse and its associated equipment, as well as all doors, windows, and vent louvers.
Fugitive dust	Sprinkle exposed soils at the proposed project site with water during construction. Erosion of exposed surfaces and soil stockpiles would be limited through standard management practices.
	Lockwood Landfill operators have increased the wetting and compaction of fly ash and are implementing a new landfill operations plan designed to reduce wind exposure of active disposal areas.

4.3 ENVIRONMENTAL IMPACTS OF NO ACTION

Under the first scenario of the no-action alternative, in which AES would shut down Greenidge Station, environmental impacts for most resource areas would be less than for the proposed project. Resource requirements and discharges and wastes would cease. Because current environmental conditions at the site would tend to revert back to conditions prior to plant operation, existing impacts would be reduced. However, adverse socioeconomic impacts would be experienced because no construction activities would be undertaken, no employment would be provided for construction workers in the area (except for some limited activity associated with mothballing or dismantling the plant), and power plant workers would lose their jobs. In addition, at other power plants where electrical generation would increase to compensate for shutting down Greenidge Station (Section 2.2.1), impacts would tend to increase because the plants would tend to be older and generate greater quantities of air emissions, liquid discharges, and solid wastes.

Under this first scenario, disposal activity at the Lockwood Landfill probably would cease. Final cover would be applied, consistent with NYSDEC permitting requirements. The multilayer final cover would consist of a low-permeability synthetic membrane layer overlain by a permeable geosynthetic drainage layer and a protective soil layer at least 2 ft thick. Vegetation would be established over the cover. Site maintenance and monitoring would continue during a 30-year post-closure period. Landfill runoff and leachate would continue to be collected and discharged periodically to Keuka Outlet, as discussed in Section 4.1.7.2, until NYSDEC determined that the leachate no longer posed a threat to human health or the environment (Title 6, Official Compilation of Codes, Rules and Regulations of the State of New York, Subpart 360-2, Landfills).

Under the second scenario of the no-action alternative, in which AES would install commercially available pollution controls to comply with current and future emissions standards, operations would remain essentially the same as for the existing plant. Resource requirements and discharges and wastes would generally be the same as under current conditions, except that air emissions would be reduced because of the enhanced pollution controls and solid wastes would likely increase due to the captured air emissions. Additional solid wastes would likely be recycled or sold as a usable product. Construction activities associated with this scenario would be similar in scale to those of the proposed project. With the exception of improving air quality, there would be minimal change in current environmental conditions at the site and the impacts would remain very similar to existing conditions.

Under the third scenario, in which AES would switch to using natural gas rather than coal at Greenidge Station, disturbance beyond the Greenidge site would be greater than for the proposed project because of construction associated with a new 14-mile natural gas pipeline to deliver the fuel. Beneficial socioeconomic effects would likely result because construction activities would probably be at a slightly greater level than those associated with the proposed project. However, the potential cumulative impacts associated with the proposed project (i.e., availability and cost of tourist lodging facilities, effectiveness of wastewater treatment services, and flow and safety of traffic on State Highway 14) could be more substantial under this scenario. Resource requirements and discharges and wastes would generally be smaller than for the proposed project because of the type of fuel and because the converted facility would be more efficient than the existing plant due to a new gas-fired delivery system and other upgrades. Air emissions, particularly SO_2 emissions, would be considerably less than under current conditions because a new gas-fired delivery system would burn more efficiently and cleanly than an aging coal-fired power plant with limited emissions controls. As a beneficial impact, ash generation would be reduced or eliminated at the power plant, depending on whether Unit 4 alone or both units were switched. Current environmental conditions and impacts at the site would be expected to improve.

Under the fourth scenario, in which AES would purchase emissions allowances (e.g., SO_2, NO_x), the existing power plant would continue operating under current conditions. Resource requirements and discharges and wastes would be the same. Negligible change in current environmental conditions would be experienced at the site and the impacts would remain very similar to existing impacts. This scenario would not provide employment for construction workers in the area. The consumption of additional water from Seneca Lake by the proposed project would not occur. The potential cumulative impacts associated with the proposed project (i.e., availability and cost of tourist lodging facilities, effectiveness of wastewater treatment services, and flow and safety of traffic on State Highway 14) would not be experienced. The proposed project's potential benefits of reducing SO_2, NO_x, HCl, HF, SO_3, and Hg air emissions would not be realized. Consequently, the potential benefits of reduced air emissions to surface waters, wetlands, and ecological resources would not be realized.